CLAIMS

1. Apparatus for assaying an analyte in blood in a blood vessel below a patient's skin comprising:

at least one light source controllable to transmit light into tissue below the skin through at least one first region on the skin;

at least one light detector that receives a portion of the transmitted light that reaches at least one second region on the skin after propagating through the blood vessel and generates signals responsive to the received light; and

a controller;

wherein the controller controls the at least one light source to transmit light at at least one wavelength that interacts with blood and at at least one wavelength that interacts with the analyte and uses the signals responsive to the light that interacts with the blood to determine a location for the blood vessel and the determined location and signals responsive to the light to assay the analyte.

2. Apparatus according to claim 1 wherein the controller controls the at least one light source and/or the at least one detector to transmit light between at least two pairs of first and second regions on the skin for which the distance between the first and second regions in one pair is different from that of the other pair.

3. Apparatus according to claim 1 or claim 2 and comprising modulating apparatus that modulates the flow of blood through the blood vessel and thereby causes corresponding modulation of the signals.

4. Apparatus according to claim 3 wherein the modulation apparatus comprises an ultrasound transmitter that illuminates the blood vessel with ultrasound.

5. Apparatus according to claim 3 or claim 4 wherein the modulation apparatus comprises a source of electrical power that applies a time varying electric field to a region of the patient's body that causes recurrent tensing and relaxation of muscles that affect the size of the blood vessel.

6. Apparatus according to any of claims 3-5 wherein the modulation apparatus comprises a mechanical resonator that applies a time varying pressure to a region of the blood vessel.

7. Apparatus according to any of claims 3-6 wherein the controller determines the location responsive to the modulation of the signals.

8. Apparatus according to any of claims 3 - 7 wherein the controller assays the analyte responsive to the modulation of the signals.

9. Apparatus according to any of the preceding claims and comprising a light pipe coupled to each of the at least one light source that transmit light from the light source to the at least one first region.

10. Apparatus according to any of the preceding claims and comprising a light pipe coupled to each of the at least one light detector that transmit light from the at least one second region to the detector.

11. Apparatus according to any of the preceding claims wherein the at least one detector comprises a plurality of detectors.

12. Apparatus according to claim 11 wherein the detectors comprise pixels in a CCD

13. Apparatus according to claim 12 and comprising a lens that collects light from the at least one second region and focuses the light on the CCD.

14. Apparatus according to any of the preceding claims wherein the light source comprises a single light source.

15. Apparatus according to any of the preceding claims wherein the light source is controllable to be moved so as to illuminate different first regions on the skin.

16. Apparatus according to any of the preceding claims wherein the analyte is glucose.

17. A method for assaying an analyte in blood in a blood vessel below a patient's skin comprising:

transmitting light at at least one wavelength that interacts with blood and at at least one wavelength that interacts with the analyte into tissue below the skin through at least one first region on the skin;

generating signals responsive to a portion of the transmitted light at each of the at least one wavelengths that reaches at least one second region on the skin after propagating through the blood vessel;

using the signals responsive to the light that interacts with the blood to determine a location for the blood vessel and the determined location and signals responsive to the light to assay the analyte.